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100918Z Apr 06

UNCLAS PARIS 002324

SIPDIS

STATE FOR EB/CIP, EUR/WE, AND EUR/ERA
USDOC FOR NTIA

E.O. 12958: N/A

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SUBJECT: LUNAR AND MARTIAN SPECTRUM COORDINATION -- FIRST
TECHNICAL PREPARATORY MEETING

1. Summary: The first technical preparatory meeting for intergovernmental coordination on a Spectrum Use Plan for Lunar and Martian Space Exploration was held March 20-23 in Paris. The meeting was hosted by the European Space Agency (ESA) and jointly chaired by ESA and NASA. All six of the space agencies with Lunar and/or Martian programs -- ESA, JAXA (Japan Aerospace Exploration Agency), Roskosmos (Russian Space Agency), CNSA (China National Space Administration), ISRO (Indian Space Research Organization) and NASA along with a representative from the European Commission -- were in attendance. The United States was represented by State (EB/CIP), NASA and Commerce (NTIA). All six agencies made one or more presentations on their exploration programs and their associated radio spectrum use plans to support those programs. There was unanimous agreement to develop a spectrum use plan to harmonize the spectrum requirements of the six space agencies and to pursue enabling interoperability among the space programs. End Summary.

2. The U.S. team gave two presentations at the meeting. The first was its Space Communication and Navigation Architecture through the 2030 time frame and the second was the Proposed Frequency Plan for Architecture Elements Used for Exploration. ESA followed with three presentations on its "Aurora" program for robotic missions to the Moon and Mars (no human missions have been approved yet), its spectrum requirements for the program and a "way forward" document on Lunar and Martian spectrum coordination. JAXA and ISRO presented their documents on Lunar and planetary missions and the spectrum requirements for those missions. Roskosmos made two presentations on its robotic and human space missions plus a presentation on a commercial Lunar program. CNSA was the last to present and, while its presentation was extensive, it was general in nature with no mention of the human space missions that have been covered in the press and few details on its spectrum requirements. In private conversations, the lone CNSA representative indicated that their delegation will be larger at the next meeting and he clearly understands that we are looking for more detailed information.

3. Separate spreadsheets were prepared that combined the mission requirements of the six agencies and the spectrum requirements to support the missions. These documents were reviewed and refined by the participants. Each agency is to submit additions and refinements to these documents prior to the second technical preparatory meeting. A list of ten action items was adopted based on the discussions, including a suggestion by Japan that we identify the active and passive sensing frequencies that may be used by missions in the vicinity of the Moon and Mars.

4. A major issue for the U.S. team was to generate interest in interoperability and cross support among the space agencies for the Lunar and Martian programs. For these meetings, interoperability is defined as the ability for spacecraft and other mission resources to interact and support each other's operation to the extent agreed to by the mission sponsors. This capability is enabled through agreement to operate in the same communication RF bands for similar functions, but it is only fully implemented when, at a later time, mission sponsors may agree on compatible communications protocols and operational concepts. Interoperability would help to control costs and help ensure the success of the space missions. All of the space agencies agreed that they are in favor of enabling interoperability with China going along with the agreement without comment. In preparation for the second meeting, each agency is to have discussions in their respective space agency to determine how interoperability can be achieved. Specifically they are to look at a general set of frequency bands and their proposed use and provide a list of earth stations which could be made available for cross-supporting another agency's missions pursuant to appropriate agreements.

5. The U.S. Team was very pleased with the results of the meeting. All of the objectives for the first meeting were

met or exceeded. There was little discussion about the intergovernmental meeting. The final products of these meetings and how they will be formalized are still open issues. It was tentatively agreed that the second technical preparatory meeting would be hosted by JAXA May 22-23 in the greater Tokyo area.

Stapleton